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Effect of auditing: Evidence from variability of stock returns and trading volume

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ABSTRACT

Although the benefits of auditing are uncontroversial in developed markets, there is scant evidence about its effect in emerging economies. Auditing derives its value by increasing the credibility of financial statements, which in turn increases investors' reliance on them in developed markets. Financial statement information is common to all investors and therefore increased reliance on it should reduce divergence in investors' assessment of firm value. We examine the effect of interim auditing on inter-investor divergence with a large sample of listed Chinese firms and find that it decreases more for firms whose reports are audited compared to non-audited firms. This finding suggests that investors rely more on audited financial information. Results of this study are robust to variations in event window length and specification of empirical measures.

1. Introduction

Global competition for scarce financial resources has made it important for emerging economies to stimulate the investment environment by improving the information that is available to ordinary investors. Emerging economies like China have responded by undertaking two approaches to reducing the divergence between sophisticated and other investors both in the public information made available to all investors and making it easier for the public to invest: improving market and legal institutions; and regulating auditing and related institutions to improve the credibility of financial statements. China set up the Shanghai and Shenzhen stock exchanges in the early 1990's and undertook major legal and market reforms in 1992. On

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the regulatory side, it re-established the auditing profession in 1980, allowed international audit firms to practice in China in 1992, established legal penalties for violating audit standards in 1992, promulgated the first set of independent auditing standards in 1995, made audit firms independent of local governments in 2000, made auditors responsible for damages suffered by investors from audit negligence from[1] 2005 and adopted international accounting and auditing standards in 2007. Similar measures have been adopted by other developing economies.

Improving the reliability of financial statements by better auditing is beneficial to ordinary investors only if such improvement makes a discernible difference in asset pricing. Otherwise, the demand for auditing will collapse and even if auditing is mandatory, audit quality will race to the bottom. While the beneficial effects of auditing in developed economies where investors are sophisticated and auditors face high legal and reputation costs are widely recognized (see US based evidence such as in Brown and Pinello, 2007), there is little evidence[2] that auditing benefits investors in emerging economies with less developed markets.

From a policy perspective, for developing economies that face competing demands for scarce resources, it is not clear whether establishing auditing as an independent institution[3] prior to establishing effective legal and market institutions[4] will lead to a lower divergence between investors and greater confidence among ordinary investors. A resolution of this issue demands the collection of systematic evidence on the effect of auditing in emerging markets. Such evidence is scarce. This paper provides evidence supporting the beneficial effects of auditing in an emerging economy.

Financial statement information affects stock prices in two ways. The first is the price effect. Beaver (1968) points out that price changes in response to earnings announcements reflect the average change in traders' beliefs. However, the average hides differential reactions between traders who rely solely on public information and sophisticated investors who develop private information in anticipation of the earnings announcement (Kim and Verrecchia, 1997). This divergence between investors is captured by stock return variability and trading volume (Callen, forthcoming; Beaver, 1968). A complete analysis of the effect of auditing calls for an examination of *inter-investor divergence*[5] in addition to *average* price changes. We argue that a reduction in inter-investor divergence – a more level playing field – creates greater confidence among ordinary investors and creates an environment that stimulates investment.

Haw et al. (2008) examines the price effect of auditing in China using a window of opportunity in which numerous listed Chinese firms had their *semi-annual* statements voluntarily audited by external auditors (annual audits are mandatory). They show that earnings response coefficients (ERC) of audited firms are higher than those for non-audited firms. In contrast, we investigate the effect of auditing on inter-investor divergence, using two measures: variability of risk-adjusted abnormal stock returns and trading volume. This approach differs from the ERC approach in three important ways. First, it captures the differential effects of auditing whereas ERC captures the average effect. Second, returns variability and trading volume encompass the overall

[1] The *Act about the Acceptance of Tort Cases Caused by Fraudulent Financial Reporting in Security Market* enacted by the Chinese Supreme Court in 2002 defined individual auditor's liability for damages to investors for undetected material misstatements and the *Act of Security,* passed in 2005 mandates that auditors be held liable for damages to investors.

[2] Chinese and other emerging markets exhibit some market tensions because of weak country-level governance, weak legal and extra-legal institutions and political economy variables (Craig, 2005; Leahy, 2004) that might reduce the overall reliability of financial statements (LaPorta et al., 1998; Haw et al., 2004; Dyck and Zingales, 2004). A strand of recent literature, however, has addressed the differential effect of auditing on the reliability of financial statements and suggests that auditing substitutes for weakness in the institutional variables mentioned above (Srinidhi et al., 2008; Choi et al., forthcoming). The results of this study are consistent with the argument that the effect of auditing in these emerging markets is in fact, stronger than in the more developed markets.

[3] Establishing the audit institution and making it effective is costly. The cost includes the costs of training and certifying competent auditors and setting up a structure in which they can provide independent opinions in addition to the cost incurred by all listed firms in getting their financial statements audited.

[4] The issue is NOT whether auditing should be promoted at all. The issue is the sequence in which reforms are undertaken. If auditing has a direct effect on asset pricing even when the legal and market institutions are weak, a reform of the auditing institutions should be undertaken early in the sequence of reforms. On the other hand, if auditing is only effective in a sophisticated market with strong legal and market institutions, audit reform is best undertaken after building those institutions.

[5] We use the term "inter-investor divergence" instead of "information asymmetry" in this paper to denote inter-investor differences in information, because the term "information asymmetry" has the connotation of information differences between managers and investors, which is not the focus of this study.

informational effect of audited interim financial reports, whereas ERC focuses on the effect of auditing on earnings only. Third, tests of variability do not rely upon an expected interim earnings model which is difficult to model, given that neither audited annual reports nor non-audited interim reports of the last year provide a justifiable proxy for expected interim earnings.

The variability of risk-adjusted stock returns has been shown to reflect divergence between informed and uninformed investors (Roll, 1988; Morck et al., 2000; Durnev et al., 2003; Ferreira and Laux, 2007). In particular, a select group of privately informed investors increase their return by buying (selling) securities when information is positive (negative) and participating in the options and futures markets. On the other hand, most investors depend on public financial information for their trades. Auditing should reduce this divergence if the market allows ordinary investors to benefit from the quality improvement in public financial information. The use of trading volume as our second measure of inter-investor divergence is also supported by a number of studies. Kim and Verrecchia (1991) use a two-period rational expectations model and show that the expected trading volume is positively associated with information divergence. Atiase and Bamber (1994) and Lobo and Tung (1997) provide empirical evidence that trading volume is associated with information divergence.

Investors aggregate financial and non-financial information available to them in pricing stocks. The findings of Banker and Datar (1989) suggest that investors could benefit from improved audited financial information quality if they correspondingly increase the weight they place on financial information and reduce the weight on other information. Using a similar Bayesian theory-based reasoning, Yeung (2009) argues that greater uncertainty in ex-ante earnings results in investors putting a greater weight on reported earnings. Financial statement information is available to all investors at the same time whereas other information could vary both across investors and in the time at which it becomes available to different investors. Higher weighting of common information reduces inter-investor divergence. Moreover, financial statement information (semi-annual) is released less frequently than other public and private information into the market. A higher weighting of the less frequent financial information also contributes to reduction in variability. At the extreme, if accounting information is the only information available for pricing the stock, the stock price would change only twice in a year, reducing the price variability to nearly zero (except around the earnings announcement times). It is the more frequent and cross-sectionally variant non-accounting information that contributes to stock price variability on a daily basis. Stock price variability will be reduced if non-accounting information is weighted less.

However, more informative announcements could increase the variability in stock returns *temporarily* after the announcement because of the difference between the announced information and prior investor beliefs. This difference will also be sharper and more pronounced for audited earnings announcements that are more accurate. Therefore, we expect a temporary increase in the variability of stock returns (or trading volume) followed by a more permanent decrease after earnings announcements for audited firms compared to non-audited firms. Consistent with our expectation, we find that subsequent to the announcement of semi-annual reports both the variability of stock returns and trading volumes are higher for a short period of two days between $t = 0$ and $t = 1$ and are then significantly smaller for the group of audited observations compared to the group of non-audited ones.[6] In effect, these findings show that audited financial information decreases inter-investor divergence more than non-audited information.

Our study contributes to the literature by showing that auditing of financial statements has the discernible effect of reducing inter-investor divergence even in an emerging economy such as China. In effect, the policy makers in emerging economies are justified in investing resources in auditing and seeking improvements in financial statement quality. In contrast to a mandatory annual audit context, this study exploits a context that allows us to directly compare differences between the effects of voluntarily audited and non-audited interim financial statements. Furthermore, this study also complements the average price level effects of auditing found by Haw et al. (2008).

The remainder of the paper is organized as follows: Section 2 provides the background and literature review; Section 3 develops the theory for the proposition that auditing affects the variability of stock returns

[6] The bid-ask-spread which is a common measure of inter-investor information divergence is not available in the Chinese market context. In a sensitivity test, we find that the daily high-low spread is significantly lower for audited firms (not tabulated).

and trading volume, and presents research questions and propositions; Section 4 gives the sample, research method and empirical results; finally, Section 5 concludes the paper.

2. Background and literature review

2.1. Context of the study: semi-annual auditing in China

Chinese regulation requires mandatory audit of annual financial statements for all listed firms. Further, it also mandates the audit of interim semi-annual statements for firms with poor performance records or weak financial positions, as well as for firms that plan to issue rights offerings or pay dividends in the second half of the year. Other firms can have their semi-annual reports audited voluntarily.[7] Nevertheless, in the period between 1997 and 2000, over seventy percent of firms that did not require to be audited got their interim statements voluntarily audited. We note here three implications of voluntary audits for our study. The effects of semi-annual audits could be attenuated by annual audits via ex-post settling up of accounts, making them less detectable. By implication, an empirical detection of reduced information divergence in this setting shows that auditing of semi-annual reports has an effect beyond the dilutive effects of ex-post settling by annual audits. Second, auditors with whom we held follow-up interviews told us that the scope, reporting requirements and audit procedures they employed in semi-annual audits were substantially similar to those used in annual audits, which makes our results generalizable to annual audits. Third, some firms might systematically self-select to be voluntarily audited. We have taken many steps in this study to control for self-selection, such as Heckman (1976) correction, two-stage regression and change-model specification.

2.2. Related work

Two strands of literature are relevant to this study. The first one examines the effect of auditing in the US. While studies on direct comparison of audited and non-audited reports are scarce, several of these studies examine the effect of audit quality differences on financial statements. The second strand of literature is on the audit structure in China that provides an understanding of why some firms voluntarily choose to be audited and others do not. This helps us in developing controls for self-selection bias.

Chow (1982) takes advantage of a historical regulation in the US in 1926, prior to securities laws, when external audit was optional in public firms. He studied the characteristics of firms that voluntarily chose to have their financial statements audited, but did not examine the differences between audited and non-audited financial statements. Other papers examine voluntary uses of auditor expertise in firms that were not mandated to get their statements audited. For example, Givoly et al. (1978) focus on the audit review function (not mandated) and examine auditor-reviewed and non-reviewed firms. Their conclusions were not definitive due to small sample and data limitations. In a follow-up study, Alford and Edmonds (1981) replicated Givoly et al. (1978) and found similar results. As the scope and procedures applicable to reviews are substantially different from those of annual audits, the results from these studies cannot be generalized to other auditing contexts.

Several other studies have examined the effect of audit quality on financial reporting by using research designs other than direct comparison. Becker et al. (1998) show that the Big 6 auditors constrain earnings management. Teoh and Wong (1993), Choi and Jeter (1992) and Loudder et al. (1992) show that earnings of firms that are audited by large auditors exhibit higher stock return responses to earnings. These studies have focused on the effect of audit quality (typically proxied by auditor size) on earnings management and stock returns and have found that higher quality audits improve the reliability of financial statements.

The Chinese stock market has attracted increasing attention from accounting and auditing researchers. Chen et al. (1999) provide a descriptive analysis of the auditing requirements and environment in China. DeFond et al. (2000) present evidence that the frequency of modified audit opinions (MAOs) increased significantly after the adoption of the auditing standards in 1995, which was immediately followed by "flight

[7] In general, voluntary auditing of semi-annual statements in China and quarterly statements in the US is not forbidden. However, our setting is different as some firms are required to have their semi-annual statements audited. This sensitizes investors and firms to the possibility and benefits of a semi-annual audit.

from audit quality." Chen et al. (2000) present empirical evidence on a negative market reaction to modified audit opinions in China. Chen et al. (2001) find that auditors are more likely to issue MAOs for regulation-induced earnings management. Haw et al. (2003) show that the timeliness of financial reporting is negatively associated with modified audit opinions. These findings document the institutional background in which our study is conducted.

2.3. Voluntary semi-annual audits in China

The reason as to why a majority of firms voluntarily undertake semi-annual audits is particularly intriguing in China because the fees for semi-annual auditing, based on our investigations with local audit firms, typically are 30–50% of annual audit fees. Moreover, the audit could lead to an unfavorable audit opinion that could impact managerial reputation and increase regulatory scrutiny. For the firms that voluntarily get their semi-annual statements audited, the expected benefits of auditing should be higher than the above-mentioned costs.

We conducted several interviews with audit partners and managers of listed companies to identify factors that motivated them to choose voluntary semi-annual audits. Some firms wanted to improve their market image (signaling), which in turn could help in their future share issuance or business negotiations, such as those for strategic alliances or joint ventures. Managers of a Shanghai company told us, for example, that they were negotiating a joint venture with a multinational company and believed that a voluntary audit would make their company more transparent and attractive to the potential partner. Some firms chose semi-annual audits with a view to making annual audits less time consuming and more manageable. As each listed firm is assigned a date by the Stock Exchange for publishing its annual report, it is important that they have the financial statements ready on time. A semi-annual audit reduces the workload of the annual audit and facilitates timely reporting. Managers also suggested that this would be particularly useful if the audit firm was small and had limited resources. Third, some firms chose external auditing to complement their internal auditing. Fourth, better performing firms that had significant increases in revenue and profits in the first half of the year were more likely to choose voluntary auditing to convey this information credibly to the investment community. These interviews helped us identify determinants of voluntary audits and develop a self-selection model to control for potential bias.

3. Theoretical development and research questions

The theoretical basis for the effect of auditing on returns' variance (or stock prices' variance) *in steady state* is obtained from the following reasoning that is formally developed in Appendix A.

1. In valuation decisions, investors aggregate accounting and non-accounting information. The relative weight placed on each of the two information sources is proportional to its performance sensitivity and precision (Banker and Datar, 1989).
2. Audit could decrease the bias and increase the precision of accounting information. If investors discern this improvement in the quality, they will place higher weight on financial statement information relative to non-financial information in audited firms compared to non-audited firms. This is shown in the first part of Appendix A.
3. Accounting information, whether it is audited or not, is common across all investors. Non-accounting information can either be public and common across investors (such as public disclosures of new product introductions, management changes, and strategic initiatives) or private (generated by the private insights of the analyst or the investor). If investors increase the weight on common accounting information, it reduces the inter-investor divergence regarding the estimated stock price for the firm. This is formally shown in the second part of Appendix A.
4. When compared to non-audited firms, audited firms' values are assessed more homogeneously across investors. This results in a smaller variability of stock returns and a lower trading volume for audited firms.

The above reasoning applies only in the steady state after most of the investors have fully incorporated the earnings information in their belief revision process. However, in the short period immediately after earnings

announcements, the stock return variability increases (Beaver, 1968; Rajgopal et al., 2002; May, 1971; Patell and Wolfson, 1981; Gillette et al., 1999; Ederington and Lee, 1996) because of the deviation between the information in the earnings announcement and prior investor beliefs. Audited information is more likely to accentuate the deviation between reported information and prior investor belief, resulting in higher transitory variability for audited firms.

We examine the effect of auditing by comparing the variability of stock returns and trading volume between the audited and non-audited firms. Our hypotheses stated in alternate form are:

H_1. Audited firms exhibit a significantly lower variability in stock returns than non-audited firms after the announcement of semi-annual reports.

H_2. Audited firms exhibit a significantly lower trading volume than non-audited firms after the announcement of semi-annual reports.

4. Sample, research method and results

4.1. The sample

We selected years 1997–2000 as our sample period because many observations had missing values before 1997 and quarterly financial reporting became mandatory after 2000. Table 1 summarizes the auditing status of listed firms during this period. Firms in China could either be restricted to domestic ownership (A shares) or could have both domestic and foreign ownership (A and B shares). Firms cross-listed in Hong Kong also issue H-shares to trade in Hong Kong. The motivations of firms issuing B or H-shares in seeking semi-annual voluntary audits are different from those issuing only A-shares. For example, B and H-share firms could get their

Table 1
Auditing status of listed A-share firms and sample selection results.

	1997	1998	1999	2000	Total
No. of listed firms	746	880	973	1080	3679
(Non-A-Share-only firms)	92	96	100	108	396
No. of A-Share firms	654	784	873	972	3283
(with missing values)	178	113	91	100	482
Firms available for sampling	476	671	782	872	2801
Audited	154	221	212	296	883
Non-audited	322	450	570	576	1918
(PT or ST)[a]	0	21	38	42	101
Non-audited	0	0	2	5	7
Audited	0	21	36	37	94
(Rights offerings)[b]	83	85	99	107	374
Non-audited	51	49	51	50	201
Audited	32	36	48	57	173
Mandatory audit	32	57	84	94	267
Modified Opinion	19	40	53	30	142
Non-audited sample	271	401	517	521	1710
Voluntary audit sample	122	164	128	202	616
Total Sample	393	565	645	723	2326

[a] A firm is publicly labeled as a Special Treatment (ST) firm if it has reported losses for two consecutive years, or when its net asset per share falls below par value. If an ST company continues to report losses in the third year, its label will change to Particular Treatment (PT) and its shares will be traded only once a week, on Fridays. All ST and PT firms are required to have their semi-annual reports audited.
[b] Firms must have their semi-annual reports audited if they plan to issue rights in the second half of the year. Firms that issue rights in the first half of the year do not have to be audited.

interim financial reports audited to attract foreign investors and to minimize their cost of capital. Therefore, we limited our sample to firms that issue only A-shares. Our sample was retrieved from the A-share file of the Taiwan Economic Journal database. Out of a total of 3679 firm-year observations that were available, we excluded 396 non-A-share-only observations and 482 with missing values, and were left with 2801 firm-year observations. Out of these, 883 were audited and 1918 were not. To examine the effect of voluntary auditing, we removed 101 observations of Special Treatment (ST) and Particular Treatment (PT) firms and 374 observations with rights issues during the year where semi-annual auditing is mandatory. This filtering process left us with a final sample of 2326 firm-year observations, of which 616 observations were voluntarily audited.

4.2. Control for self-selection bias–Heckman correction

To control for self-selection, we use the Inverse Mill's Ratio (IMR) estimated by a probit model of voluntary audit choice as an additional control variable when comparing the effects between audited and non-audited firms (Johnston and DiNardo, 1997; Heckman, 1976). In additional analysis, we also complement these results using other methods. We discuss below the probit model.

Our choice of variables for the model is based both on earlier empirical tests and our interviews with managers and auditors in China. While there is no published study that models voluntary audit choice, two prior studies are helpful in identifying relevant variables. Francis et al. (1999) study examines the choice between Big 6 and non-Big 6 auditors in the US by firms to signal better financial statement quality. Signaling by voluntary audit choice is similar to signaling by voluntary choice of a high quality auditor and has been mentioned as one of the factors in our interviews with managers. However, because Francis et al. (1999) is conducted in the US, we also rely on Chen et al. (2001) who find that earnings management incentives in China might motivate voluntary audit decisions. In addition to these two studies, Chow (1982) and Ettredge et al. (2000) provide additional guidance in the choice of variables. Our interviews of managers of listed firms who had the choice to be audited and of auditors who audited some of those firms also yielded some important factors. Based on the findings of prior studies and our interviews, we developed the following probit model to control for self-selection:

$$\begin{aligned}\Pr(z_{it}=1)_{it} = {} & \gamma_0 + \gamma_1 OPCYCLE_{it-1} + \gamma_2 CAPINT_{it-1} + \gamma_3 Size_{it-1} + \gamma_4 Leverage_{it-1} + \gamma_5 PE_{it-1} \\ & + \gamma_6 ROA_{it-1} + \gamma_7 Loss_{it} + \gamma_8 Top5_{it-1} + \gamma_9 TACCR_{it-1} + \gamma_{10} SalesGrwth_{it-1} + \gamma_{11'} Beta_{it-1} \\ & + \gamma_{12} Nontrade_{it-1} + \gamma_{13} y98 + \gamma_{14} y99 + \gamma_{15} y00 + \sum_{k=1}^{21} \gamma_{16k} IND_{ik} + u_{it} \end{aligned} \quad (1)$$

We give below the definitions and then discuss the rationale for selection of the variables in the above model.

Definitions:

OPCYCLE = Operating Cycle: [365 * (average inventory/cost of goods sold) + 365 * (average accounts receivable/sales)]/30.
CAPINT = Capital Intensity: Gross PP&E/sales.
Size: natural logarithm of total assets.
Leverage: total long-term debt to total asset ratio.
PE = P/E Ratio: Stock price over EPS.
ROA = semi-annual net income over beginning total assets.
Loss: 1 for net income less than 0 and 0 otherwise.
TACCR = Total Accrual: annual total accruals.
Top5 = Top 5 Auditor: 1 if the auditor is among the top 5 in China (by market share) and 0 otherwise.
SalesGrwth = Sales growth: (sales in year t – sales in year $t-1$)/sales in year $t-1$.
Beta: Beta estimated by the market model over the period between $t=-150$ to $t=-30$.
Nontrade: Percentage of non-tradable shares outstanding.
y98, y99 y00, indicator variables for years 1998, 1999 and 2000, respectively.
IND: Twenty-one Industry dummies based on Chinese industry classification.

i: firm indicator.
t: interim period indicator, $t-1$ for beginning of the year.

The inclusion of *OPCYCLE, CAPINT, Size, Leverage, PE* and *Loss* in the model is based on Francis et al. (1999). Firms with longer operating cycles develop accrual estimates over a longer time horizon and are therefore likely to have more measurement errors (see Dechow and Dichev, 2002). This resulting skepticism among investors increases the need felt by the firm to send a positive audit signal. Accordingly, we expect firms with longer operating cycles to opt more frequently for voluntary auditing. Firms with high capital intensity (defined as gross property, plant and equipment divided by sales) have relatively high depreciation, and their managers can choose the depreciation method as well as estimated useful asset lives to time the recognition of related expenses. Here again, auditing can improve the perceived reliability of reported earnings and asset values.[8] We include firm size in our model to control for firm-level differences in innate credibility and their information environment. We expect large firms to have less need for semi-annual auditing, *ceteris paribus*, since their financial reports are more carefully scrutinized by the public than those of smaller firms. Consequently, their financial reports are generally perceived to be more reliable. As a firm's debt level increases, its debt holders may need to monitor its management team more closely. Therefore, firms with high leverage ratios are more likely to employ semi-annual audits. Firms with low Price Earnings (PE) ratios are often undervalued. Managers of these firms are more likely to resort to external auditing in their attempts to communicate to investors that their firms are good investment opportunities. Thus, we expect firms with lower PE ratios to opt more frequently for interim auditing.

The selection of four other variables, namely *ROA*, *Top5*, *SalesGrwth*, and *Loss,* was based on our interviews with partners of audit firms and managers of listed companies. *ROA* is the ratio of the semi-annual period income over the previous year-end's total assets. Some partners suggested that firms that do well in the first part of the year choose to be audited to signal the good news early to the market. Based on this rationale, we expect the audited firms to have a significantly higher *ROA* than non-audited firms. Large (*Top5*) auditors are more independent, have high reputation and are more likely to issue modified audit opinions (DeFond et al., 2000, 2002; Ashton and Kennedy, 2002).[9] In anticipation of being held to higher standards by large auditors, firms might be less willing to be voluntarily audited by them. Another factor is auditor workload. Small auditors have limited resources that are stretched during annual audits and might encourage their clients to opt for semi-annual audits to smooth out their workload. At the same time, the voluntary audit choice signal will be even more powerful and the benefits might be seen to be higher if a Top5 auditor is chosen. Therefore, we do not predict a sign on this variable but recognize that it is an important control variable. Firms with low sales growth or losses reported in the most recent fiscal period are expected to be less willing to have their semi-annual reports audited.

Further, high-risk firms (those with high accruals and high beta values) are likely to weigh the negative consequences of audit more than its incremental benefits; but low-risk firms are more likely to choose to be audited. A variable that is unique to China is the percentage of outstanding non-tradable shares which proxies for government control of the firm. Usually, managers in government-controlled firms have less need to communicate with investors, as these firms depend less on the market for finance and receive government protection from regulators and investors. Therefore, we expect firms with more non-tradable shares to show a lower propensity to have their semi-annual reports audited. In our model, we employ an indicator variable for each year and each industry to control for industry and year effects.

In order to construct a parsimonious model, we exclude variables that are trivial in our sample or not reported to be significant in prior studies. For example, the proportion of common stock owned by officers and directors is not included because both the mean and median values of this variable in our sample are

[8] As our test context is different from that of Francis et al. (1999), who employed operating cycle and capital intensity to examine Big 6 auditors' role in the credible reporting of accruals, we do not expect all variables adopted from their model to affect the choice of semi-annual auditing in the same way that they affect the choice of Big 6 auditors.

[9] Identifying a group of large auditors as high quality in China may be arbitrary. Therefore, we also used other classification schemes such as Top 10 (DeFond et al., 2000) instead of Top 5 and did not find qualitatively different empirical results.

too low to affect the audit choice. The ratios of inventory and receivables over total assets are captured by total accruals in our model. The number of business segments is not relevant for most firms.

We report the probit model results in Table 2. The results are generally consistent with our expectations. They show that the decision for semi-annual auditing is negatively associated with PE ratio, loss reported in the previous year, large auditor (*Top5*), risk (*Beta*) and percentage of non-tradable shares outstanding. Leverage, profitability (*ROA*) and sales growth are positively associated with the choice for semi-annual auditing. Firm size has a negative coefficient but is not statistically significant, and the likelihood ratio is very significant, which indicates that the probit model effectively differentiates between audited and non-audited observations.

The Heckman (1976) correction for self-selection bias is an appropriate method to use in this particular context for the following reasons. The method is robust in cases where the two sets of variables overlap (one used for the probit model and the other to determine the effect of audit on information divergence). Johnston and DiNardo (1997) argue that this correction is less sensitive to normality assumptions when these two sets of variables differ. In this study, the variables that affect the outcome include the variability of the returns prior to the announcement and other variables that differ from variables used in the probit model. This makes the IMR method less sensitive to normality assumptions. Second, in most situations, it is difficult to find variables that affect probability but do not factor in the equation that tests the differences (Johnston and DiNardo, 1997). In our study, we use a number of variables that affect stock market variability and trading volume but they do not necessarily predict the choice of voluntary auditing. For example, random arrival of value relevant information may affect both return variability and trading volume. However, it is not expected to affect the choice for semi-annual audit. We include the absolute value of cumulative abnormal returns during the announcement period to control for this factor in the model for testing the effect of auditing, but not in the probit model.[10]

4.3. Effect of auditing on stock-return variability and trading volume

4.3.1. Auditing and stock-return variability

The following model is employed to compare the standard deviations of the risk-adjusted abnormal daily returns between audited and non-audited sub-samples following the announcement of interim financial reports:

$$v_{post} = \alpha_0 + \alpha_1 Audit + \alpha_2 v_{pre} + \alpha_3 Size + \alpha_4 v_{annual} + \alpha_5 IMR + \alpha_6 ABS\_CAR + \alpha_7 y98 + \alpha_8 y99 + \beta_9 00 + \varepsilon \quad (2)$$

where v_{post} is the standard deviation of firm's risk-adjusted abnormal daily returns after semi-annual audit, $Audit = 1$ if audited and 0 if not audited, v_{pre} is the standard deviation of firm's risk-adjusted abnormal daily returns before semi-annual audit, v_{annual} is the standard deviation of firm's returns after announcement of annual earnings made prior to each semi-annual audit, *Size* is the natural logarithm of equity's beginning market value, *IMR* is the Inverse Mills Ratio from the probit model, *ABS_CAR* is the absolute value of risk-adjusted cumulative abnormal returns over the post-announcement period and *y98, y99, y00* are indicator variables for the years 1998, 1999 and 2000, respectively.

Post-announcement return variability is measured by the standard deviation of risk-adjusted[11] daily abnormal returns over three different event windows after the semi-annual earnings announcement date (+1 to +7, +1 to +15 and +1 to +30). Likewise, pre-announcement return variability is measured by the standard deviation of risk-adjusted abnormal returns over three different time windows before the semi-annual earnings announcement dates (−7 to −1, −15 to −1 and −1 to −30). The announcement date is excluded from both pre- and post-announcement periods. This model is estimated separately over each of the three event windows. A significant negative coefficient on the indicator variable, *Audit,* would indicate that audited semi-annual financial statements are associated with less return variability than non-audited firms.

[10] Larcker and Rusticus (2005) show limitations of using instrumental variables in accounting research. As an exercise of caution in interpreting our results, extensive robustness checks are performed and discussed in a subsequent section.

[11] We estimate the alpha and beta of each firm year over the period between 150 and 30 days before the announcement of its semi-annual report. In order to address concerns about the reasonableness of the market model in China and other emerging markets, we have repeated all the tests with market-adjusted return data and found qualitatively similar results.

Table 2
Control for self selection – probit regression results.

$$\Pr(z_{it}=1)_{it} = \gamma_0 + \gamma_1 OPCYCLE_{it-1} + \gamma_2 CAPINT_{it-1} + \gamma_3 Size_{it-1} + \gamma_4 Leverage_{it-1} + \gamma_5 PE_{it-1} + \gamma_6 ROA_{it-1} + \gamma_7 Loss_{it} + \gamma_8 Top5_{it-1} + \gamma_9 TACCR_{it-1} + \gamma_{10} SalesGrwth_{it-1} + \gamma_{11'} Beta_{it-1} + \gamma_{12} Nontrade_{it-1} + \gamma_{13} y98 + \gamma_{14} y99 + \gamma_{15} y00 + \sum_{k=1}^{21} \gamma_{16k} IND_{ik} + u_{it}$$

	Estimate	Wald chi-square
Intercept	1.265	3.202*
OPCYCLE	−0.001	0.059
CAPINT	−0.180	4.418**
Size	−0.069	1.304
Leverage	1.203	9.445***
PE	−0.325	14.561***
ROA	13.645	47.137***
Loss	−1.867	19.572***
Top5	−0.718	4.234**
TACCR	0.007	0.001
SalesGrwth	0.201	5.493**
Beta	−0.919	25.540***
Nontrade	−1.880	22.901***
y98	−0.203	1.712
y99	−0.740	21.210***
y00	−0.238	2.351
(21 Industry indicator variables not tabulated)		
Likelihood ratio test:		1186
Pseudo *R*-square		0.186
$N = 1710$ for non-audited and 616 for audited group		

Dependent variable is an audit choice indicator: 1 for audited interim financial statements and 0 otherwise. All independent variables are measured at the beginning of the year except *ROA* which is semi-annual net income over total assets at the last year end. *OPCYCLE*: 365 * (average inventory/cost of goods sold) + 365 * (average accounts receivable/sales)/30; *CPINT*: Gross PP&E/sales; *Size*: Natural logarithm of total assets; *Leverage:* Total debt to total asset ratio; *PE*: Stock price over EPS; *Loss*: 1 for net income less than 0 and 0 otherwise; *TACCR*: Annual total accruals; *Top5*: 1 if the auditor is among the top 5 in China and 0 otherwise; *SalesGrwth*: (sales in year t – sales in year $t-1$)/sales in year $t-1$; *Beta*: Beta estimated by the Market Model; *Nontrade*: Percentage of non-tradable shares outstanding; *y98*, *y99*, *y00*: Indicator variables for years 1998, 1999 and 2000, respectively.

* Significant at 10%, two-tailed.
** Significant at 5%, two-tailed.
*** Significant at 1%, two-tailed.

We control for market size (natural logarithm of the market value of equity at $t = -30$) because larger firms resemble diversified portfolios and consequently have lower return variability. The pre-announcement standard deviation of returns (respectively over the three event windows) is a control for other firm-specific factors that affect the variability of returns. It also captures the level of pre-announcement information divergence among investors as Atiase and Bamber (1994) find it to be positively related with trading volume reaction to announcements of accounting information. Additionally, Atiase and Bamber (1994) also find that trading volume reaction is positively associated with the absolute value of cumulative abnormal returns during the announcement period. Therefore, *ABS_CAR* is included to control for this effect. As a further control for firm-specific factors, we include the post-annual-announcement return variability of the previous year when all financial reports are audited. This control variable is necessary because of the possibility that the trading behavior of investors could be different between the audited and non-audited groups in our sample irrespective

of the effect of semi-annual audits. We control for year-specific effects by year dummies. Finally, we control for self-selection bias by including the IMR from the probit model as an additional control variable.

4.3.2. Auditing and trading volume

We employ the following model to examine the effects of auditing on average daily trading volume in the three windows defined earlier:

$$TV_{post} = \beta_0 + \beta_1 Audit + \beta_2 TV_{pre} + \beta_3 Size + \beta_4 TV_{annual} + \beta_5 IMR + \beta_6 MTV + \beta_7 ABS\_CAR + \beta_8 y98 + \beta_9 y99 + \beta_{10} y00 + \varepsilon \quad (3)$$

where TV_{post} is the average daily trading volume after semi-annual announcements, $Audit = 1$ if audited and 0 if not audited, TV_{pre} is the average daily trading volume before semi-annual announcements, *Size* is the natural logarithm of equity's beginning market value, TV_{annual} is the average daily trading volume after annual announcements, *IMR* is the Inverse Mills Ratio from the probit model, *MTV* is the average daily market trading volume, *ABS_CAR* is the absolute value of risk-adjusted cumulative abnormal returns over the post-announcement period and *y98, y99, y00* are indicator variables for the years 1998, 1999 and 2000, respectively.

We measure trading volume as the average daily percentage of outstanding shares traded for a given firm. The market-wide trading volume is the average daily total number of all trades divided by the total number of all outstanding shares for the stock exchange.

We control for firm-specific effects by including the natural logarithm of the market value of equity at $t = -30$, the pre-announcement trading volume and the post-annual announcement trading volume in the regression. We use market-wide average daily trading volume to control for the market-wide trading intensity effect on the trading volume of the firm. We employ TV_{pre} and *ABS_CAR* to control for the effect of the positive association between these two variables and the trading volume reaction to disclosure of accounting information as reported in Atiase and Bamber (1994). Finally, we use year indicator variables, and include the *IMR* to control for fixed effects and self-selection bias, respectively.

4.4. Univariate analysis

Panel A of Table 3 presents the descriptive statistics of the variables, v_{pre}, v_{post}, v_{annual} (standard deviations of firm returns before and after semi-annual earnings announcements, and after the previous annual announcements, respectively) and market size. The variability after the announcement of semi-annual reports (v_{post}) is significantly ($p < 0.01$) lower for the audited group than for the non-audited group in all the three event windows.

The magnitude of the difference in the variability after announcements is about 10% in each of the three windows. The pre-announcement period return variability (v_{pre}) is also higher for the non-audited group in the 15 and 30-day event windows, but not in the 7-day window. The change in return variability ($v_{post} - v_{pre}$) is positive only in the 7-day event window for the non-audited group. Its negative value in all other cells indicates a general decrease in the variability of stock returns for both audited and non-audited groups after the announcement of interim reports. Moreover, the decrease in the variability is significantly larger for the audited group in all event windows. Though these results are consistent with our expectations, we do not attempt to draw conclusions based on the univariate results without controlling for other factors that may affect the difference between the audited and non-audited groups. The absolute value of cumulative abnormal returns is significantly smaller at conventional levels for the audited group only in the 7-day and 15-day event windows, which indicates that the effect of auditing on the abnormal returns does not persist into the future. Audited observations are larger in terms of market capitalization. The *IMR*, by construction, is significantly different between audited and non-audited observations. Noting that all firms need to be audited annually, a comparison of v_{annual} between audited and non-audited firms fails to show significant differences in any of the three event windows. This corroborates the interpretation that the differences after semi-annual audits are not driven by systematic differences between audited and non-audited firms, because when annual financial reports

Table 3
Descriptive statistics and univariate comparisons of stock-return variability and trading volume between audited and non-audited firms.

Variable	Days	Non-audited			Audited			T	z
		Mean	Std	Median	Mean	Std	Median		
Panel A: Variability model variables									
Stock return variability									
V_{post}	7	2.115	0.930	1.931	1.899	0.864	1.713	5.22***	5.12***
V_{pre}	7	2.055	0.950	1.856	2.055	0.904	1.819	0.01	0.48
$V_{post} - V_{pre}$	7	0.060	1.152	0.073	−0.156	1.118	−0.145	4.08***	4.924***
V_{annual}	7	2.345	1.139	2.077	2.301	1.115	2.050	0.82	0.64
ABS_CAR	7	4.649	3.995	3.546	4.348	3.750	3.547	1.68*	−1.21
V_{post}	15	2.046	0.728	1.933	1.829	0.654	1.691	6.84***	6.47***
V_{pre}	15	2.136	0.790	1.990	2.077	0.745	1.961	1.66*	1.22
$V_{post} - V_{pre}$	15	−0.090	0.885	−0.08/2	−0.247	0.838	−0.260	3.95***	3.95***
V_{annual}	15	2.349	0.968	2.163	2.314	0.934	2.151	0.79	0.49
ABS_CAR	15	6.739	5.646	5.272	6.286	5.310	5.039	1.78*	1.27
V_{post}	30	1.942	0.602	1.885	1.783	0.514	1.703	6.27***	5.52***
V_{pre}	30	2.251	0.703	2.161	2.170	0.686	2.053	2.47**	2.59***
$V_{post} - V_{pre}$	30	−0.309	0.775	−0.289	−0.387	0.727	−0.328	2.26*	2.00*
V_{annual}	30	2.413	0.794	2.334	2.362	0.782	2.231	1.40	1.36
ABS_CAR	30	9.780	8.283	7.523	9.317	8.005	7.355	1.22	1.21
Size	30	7.733	0.747	7.696	7.873	0.755	7.876	−3.96***	−4.19***
IMR	30	−0.427	0.218	−0.419	1.051	0.275	1.025	−120.63***	−36.85***
Panel B: Trading volume model variables									
Trading Volume									
TV_{post}	7	2.038	1.516	1.674	1.580	1.247	1.281	6.97***	6.13***
TV_{pre}	7	1.685	1.254	1.446	1.501	1.106	1.233	3.02***	2.82***
$TV_{post} - TV_{Pre}$	7	0.352	1.588	0.154	0.079	1.254	0.044	4.31***	3.88***
TV_{annual}	7	3.024	2.050	2.772	3.167	2.163	2.817	−1.09	−1.10
MTV	7	1.584	1.704	0.424	1.590	1.723	0.448	−0.30	−0.46
TV_{post}	15	1.931	1.481	1.411	1.467	1.179	1.029	8.63***	7.11***
TV_{pre}	15	1.738	1.426	1.309	1.526	1.184	1.187	3.69***	4.06***
$TV_{post} - TV_{Pre}$	15	0.193	1.381	0.112	−0.592	1.149	−0.010	4.41***	4.01***
TV_{annual}	15	2.819	2.052	2.349	2.941	2.094	2.371	−1.09	−1.26
MTV	15	1.545	1.587	0.349	1.568	1.665	0.371	−1.34	−1.39*
TV_{post}	30	1.729	1.153	1.424	1.305	0.810	1.104	9.85***	8.11***
TV_{pre}	30	1.948	1.321	1.616	1.721	1.298	1.353	3.71***	4.43***
$TV_{post} - TV_{Pre}$	30	−0.220	1.410	−0.097	−0.416	1.203	−0.242	3.30***	3.83***
TV_{annual}	30	2.703	1.856	2.259	2.693	1.836	2.188	0.12	0.19
MTV	30	1.409	0.256	1.358	1.423	0.270	1.409	−1.07	0.76
Size	30	7.744	0.752	7.707	7.877	0.759	7.891	−3.74***	−3.955***
IMR	30	−0.427	0.219	−0.419	1.050	0.273	1.021	−120.70***	−36.82***

V_{post}: Standard deviation of risk-adjusted abnormal returns after semi-annual announcements ($0 < t < 8$, $0 < t < 16$ and $0 < t < 31$ for 7-day, 15-day and 30-day event windows, respectively); V_{pre}: Standard deviation of risk-adjusted abnormal returns before semi-annual announcements ($-8 < t < 0$, $-16 < t < 0$ and $-31 < t < 0$ for 7-day, 15-day and 30-day event windows, respectively); V_{annual}: Standard deviation of risk-adjusted abnormal returns after annual announcements ($0 < t < 8$, $0 < t < 16$ and $0 < t < 31$ for 7-day, 15-day and 30-day event windows, respectively); *ABS_CAR*: absolute value of risk-adjusted cumulative abnormal returns over the post-announcement period; *Size*: Natural logarithm of beginning market value of equity; TV_{post}: Average daily trading volume after semi-annual announcements ($0 < t < 8$, $0 < t < 16$ and $0 < t < 31$ for 7-day, 15-day and 30-day event windows, respectively); TV_{pre}: Average daily trading volume before semi-annual announcements ($-8 < t < 0$, $-16 < t < 0$ and $-31 < t < 0$ for 7-day, 15-day and 30-day event windows, respectively); TV_{annual}: Average daily trading volume after annual announcements ($0 < t < 8$, $0 < t < 16$ and $0 < t < 31$ for 7-day, 15-day and 30-day event windows, respectively); *MTV*: Market-wide average trading volume after semi-annual announcements ($0 < t < 8$, $0 < t < 16$ and $0 < t < 31$ for 7-day, 15-day and 30-day event windows, respectively); *IMR*: Inverse Mills ratio as estimated by Model (1); $N = 1710$ (1706) for non-audited group and 616 (615) for audited group in Panel A (B).

* Significant at 10%, two-tailed.
** Significant at 5%, two-tailed.
*** Significant at 1% two-tailed.

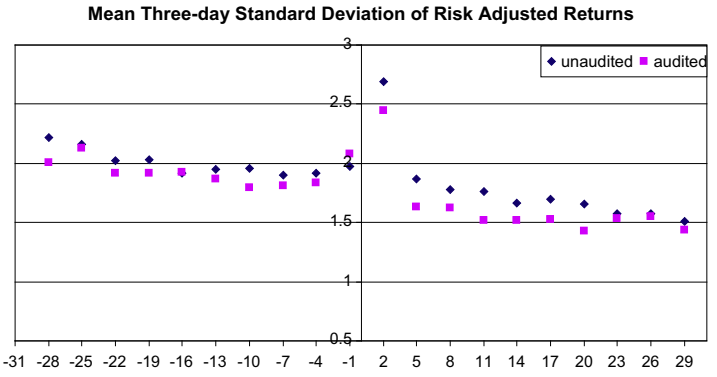

Figure 1.

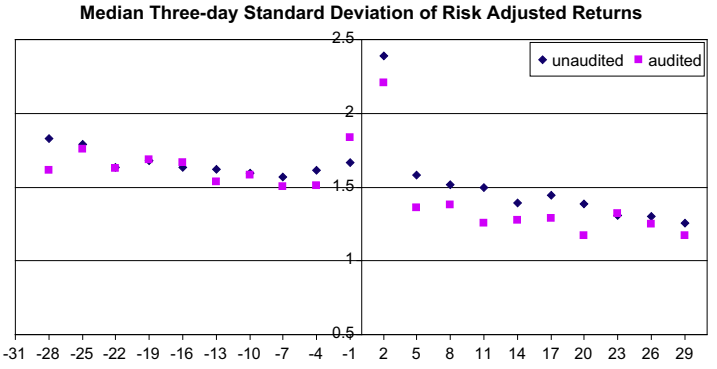

Figure 2.

are required to be audited for all listed firms, there is no systematic difference in stock return variability during any of the post-announcement periods (+1 to +7, +1 to +15, +1 to +30).

Comparison of trading volume in Panel B of Table 3 shows that the average daily post-announcement trading volume for the audited group is significantly smaller than that of the non-audited group in all the three event windows. The magnitude of the difference varies from 22% to 24%, which is economically material. The decrease in average trading volume over the pre- and post-announcement periods is significantly larger for the audited group than for the non-audited groups in all three event windows. Specifically, between −7 and +7 days relative to the announcement of semi-annual reports, the average trading volume increases slightly for both audited (from 1.501 to 1.580) and non-audited groups (from 1.685 to 2.038), but the change is much smaller for the audited (0.079) than for the non-audited group (0.647). In the −15 to +15 window, the average trading volume of the audited group drops from 1.526 to 1.467 (3.8%), but it increases for the non-audited group from 1.738 to 1.931 (11.1%). In the −30 to +30 period, the average trading volume for the audited group drops from 1.721 to 1.305 (24.2%), overshadowing that of the non-audited group, which is only 11.2% from 1.948 to 1.729. A comparison of TVR_{annual} between audited and non-audited groups does not exhibit significant or consistent differences across the three windows. This result further augments the interpretation that the difference in trading volume after semi-annual audits is not driven by systematic differences between audited and non-audited firms.

We also plot the three-day mean and median values of variability of returns and trading volume over the period between −30 and +30 in Figs. 1–4. Consistent with our expectations, there is a marked increase in both measures of inter-investor information divergence immediately following the announcement of semi-annual reports (0 to +2), but a sustained decrease thereafter. The decreases in the return variability and trading volume are consistently greater in the audited group than in the non-audited group.

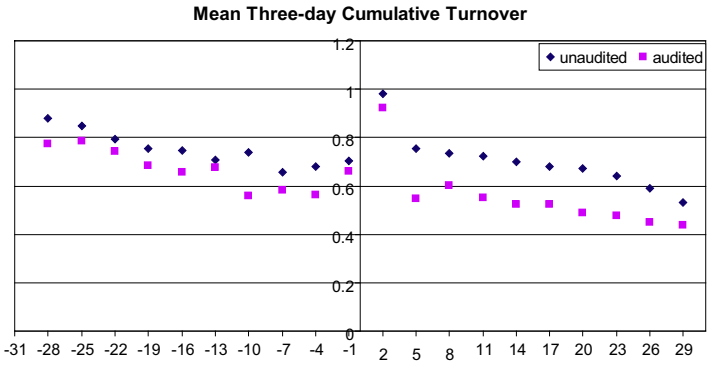

Figure 3.

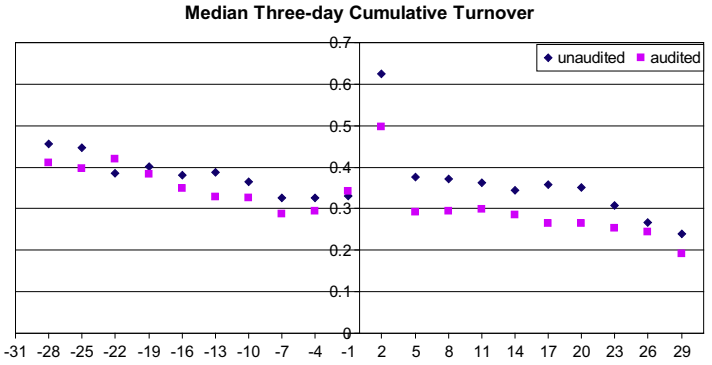

Figure 4.

In effect, these figures show patterns after earnings announcements that are consistent with (i) short-term increases in variability and volume reported in the literature, (ii) a steady state decrease in inter-investor belief divergence for all firms and (iii) a relatively higher decrease in divergence for the audited firms.

4.5. Multivariate analysis

Table 4 summarizes regression results comparing return variability and trading volume between the audited and the non-audited groups. Panel A of Table 4 shows the return variability results of Model 2; and panel B of Table 4 shows the trading volume results of Model 3. *Audit* coefficients in both models are significantly ($p < 0.01$) negative across three different window lengths, which indicates that audited financial statements are associated with smaller standard deviations of stock returns and lower average daily trading volume. Compared to the mean value of the standard deviation of returns in non-audited firms, the coefficients of *Audit* suggest a reduction of 31% in the 7-day window, 35% in the 15-day window and 30% in the 30-day window. Similarly, the turnover reductions are 87%, 94% and 93.7% respectively in the 7, 15 and 30-day windows.[12] These reductions are both statistically significant and economically material.

The adjusted R^2 of the variability model increases for longer event windows, mainly because of increased association between post- and pre-announcement standard deviations. The *IMR* coefficients are significant in all cases. Consistent with our expectations, the post-announcement return variability and trading volume are

[12] These computations are performed as follows. Consider the standard deviation of returns, V_{post} for non-audited firms in the 7-day window in Table 3 = 2.115. The coefficient of *Audit* in Table 4 for the 7-day window is −.654. The reduction is computed as .654/2.115 = 31%.

Table 4
Multivariate analysis of the effect of audit on stock-return variability and trading volume.

Event window	7 Days ($0 < t < 8$)		15 Days ($0 < t < 16$)		30 Days ($0 < t < 31$)	
Panel A: Return variability model (V_{post})						
Intercept	3.145	(16.14)***	2.599	(16.26)***	2.335	(18.00)***
Audit	−0.654	(−5.48)***	−0.715	(−7.73)***	−0.587	(−7.80)***
V_{pre}	0.136	(6.79)***	0.213	(11.66)***	0.243	(14.18)***
Size	−0.190	(−7.86)***	−0.150	(−7.94)***	−0.149	(−9.68)***
V_{annual}	0.030	(1.99)**	0.045	(3.05)***	0.059	(4.02)***
IMR	0.323	(4.36)***	0.363	(6.36)***	0.308	(6.58)***
ABS_CAR	0.082	(16.97)***	0.042	(16.63)***	0.020	(14.26)***
Y98	−0.087	(−1.54)	0.021	(0.50)	0.227	(6.84)***
Y99	−0.224	(−3.88)***	−0.184	(−4.02)***	−0.185	(−4.98)***
Y00	−0.228	(−4.20)***	−0.108	(−2.50)**	0.033	(0.94)
Adjusted R^2	0.248		0.296		0.329	
$n = 1710$ (616) for non-audited (audited) group						
Panel B: Trading volume model (TV_{post})						
Intercept	0.605	(1.50)	2.129	(5.26)***	2.433	(8.25)***
Audit	−1.766	(−9.34)***	−1.814	(−11.11)***	−1.621	(−11.57)***
TV_{pre}	0.466	(17.33)***	0.423	(17.09)***	0.268	(13.81)***
Size	−0.174	(−4.68)***	−0.251	(−7.53)***	−0.299	(−10.42)***
TV_{annual}	0.020	(1.83)*	0.026	(2.04)**	0.080	(5.56)***
IMR	0.985	(8.28)***	0.995	(9.63)***	0.869	(9.84)***
MTV	0.940	(7.44)***	0.511	(3.15)***	0.467	(4.13)***
ABS_CAR	0.144	(15.52)***	0.072	(14.41)***	0.033	(11.97)***
Y98	0.397	(2.79)***	0.167	(1.11)	0.522	(6.73)***
Y99	0.208	(1.74)*	−0.059	(−0.48)	0.055	(0.63)
Y00	0.095	(1.03)	0.209	(2.51)**	0.392	(5.81)***
Adjusted R^2	0.455		0.421		0.373	
$n = 1706$ (615) for non-audited (audited) group						

White-covariance-consistent t is reported in parentheses next to the estimated coefficient. Dependent variable in Panel A is V_{post}: Standard deviation of risk-adjusted abnormal returns after semi-annual announcements; V_{pre}: Standard deviation of risk-adjusted abnormal returns before semi-annual announcements; V_{annual}: Standard deviation of risk-adjusted abnormal returns after annual announcements; *Size*: Natural logarithm of beginning market value of equity; *IMR*: Inverse Mills ratio; *ABS_CAR*: absolute value of risk-adjusted cumulative abnormal returns over the post-announcement period. Dependent variable in Panel B is TV_{post}: Average daily trading volume after semi-annual announcements; TV_{pre}: Average daily trading volume before semi-annual announcements; TV_{annual}: Average daily trading volume after annual announcements; *MTV*: Market-wide average daily trading volume after semi-annual announcements.

* Significant at 10%, two-tailed.
** Significant at 5%, two-tailed.
*** Significant at 1%, two-tailed.

significantly and positively associated with pre-announcement and post-annual announcement return variability and trading volume, respectively. *Size* has a negative association with return variability and trading volume in all three event windows. Consistent with results reported by Atiase and Bamber (1994), the estimated coefficients of our measures of pre-announcement level of belief divergence (v_{pre}, TV_{pre}) and *ABS_CAR* are significantly ($p < 0.01$) positive. Results in both Panel A (variability) and Panel B (trading volume) are consistent with our prior expectations; they suggest greater information convergence in the audited group than in the non-audited group after controlling for self-selection (*IMR*), general information environment (*Size*), other inherent differences in the variability (v_{pre}, v_{annual}, TV_{pre}, *MTV*), and year-specific effects (year dummies).

4.6. Alternative control for self-selection: two-stage regression

We employ a two-stage regression analysis through estimation of a simultaneous system of equations in which the post-announcement return variability (or trading volume) is determined simultaneously with the choice of semi-annual audit. We then use all the control variables that we have identified in Models 1–3 to solve the model. Since one of the endogenous variables (*Audit*) is dichotomous and the other (V_{post}) is continuous, we adapt the program suggested by Keshk (2003), which is specifically designed to solve this type of

Table 5
Alternative control for self-selection bias: two-stage regression.

Event window	7 Days ($0 < t < 8$)		15 Days ($0 < t < 16$)		30 Days ($0 < t < 31$)	
Panel A: Return variability model (V_{post})						
Intercept	2.915	(13.98)***	2.370	(13.67)***	2.129	(14.74)***
Audit	−0.769	(−5.88)***	−0.854	(−8.03)***	−0.728	(−8.33)***
V_{pre}	0.146	(7.54)***	0.217	(11.3)***	0.252	(13.26)***
Size	−0.156	(−5.77)***	−0.113	(−5.17)***	−0.115	(−6.38)***
V_{annual}	0.025	(1.58)	0.038	(2.45)**	0.049	(3.14)***
ABS_CAR	0.082	(18.31)***	0.042	(16.5)***	0.019	(13.57)***
Y98	−0.092	(−1.63)	0.015	(0.33)	0.218	(5.76)***
Y99	−0.259	(−4.23)***	−0.224	(−4.46)***	−0.231	(−5.53)***
Y00	−0.254	(−4.26)***	−0.137	(−2.83)***	0.002	(0.05)
Adjusted R^2	0.229		0.249		0.269	
$n = 1710$ (616) for non-audited (audited) group						
Panel B: Trading volume model (TV_{post})						
Intercept	−0.073	(−0.16)	1.426	(2.89)***	1.853	(5.02)***
Audit	−2.039	(−9.14)***	−2.059	(−10.12)***	−1.858	(−10.50)***
TV_{pre}	0.462	(20.85)***	0.416	(18.45)***	0.266	(13.02)***
Size	−0.090	(−1.94)*	−0.164	(−3.91)***	−0.228	(−6.31)***
TV_{annual}	0.030	(2.31)**	0.037	(2.63)***	0.081	(5.41)***
MTV	0.972	(7.00)***	0.539	(2.87)***	0.531	(3.78)***
ABS_CAR	0.143	(19.67)***	0.072	(15.34)***	0.033	(11.95)***
Y98	0.438	(2.68)***	0.196	(1.15)	0.529	(5.66)***
Y99	0.190	(1.45)	−0.070	(−0.52)	0.016	(0.16)
Y00	0.047	(0.45)	0.166	(1.77)*	0.334	(4.07)***
Adjusted R^2	0.365		0.313		0.264	
$n = 1706$ (615) for non-audited (audited) group						

Dependent variable in Panel A is V_{post}: Standard deviation of risk-adjusted abnormal returns after semi-annual announcements; V_{pre}: Standard deviation of risk-adjusted abnormal returns before semi-annual announcements; V_{annual}: Standard deviation of risk-adjusted abnormal returns after annual announcements; *Size*: Natural logarithm of beginning market value of equity; *ABS_CAR*: absolute value of risk-adjusted cumulative abnormal return over the post-announcement period. Dependent variable in Panel B is TV_{post}: Average daily trading volume after semi-annual announcements; TV_{pre}: Average daily trading volume before semi-annual announcements; TV_{annual}: Average daily trading volume after annual announcements; *MTV*: Market-wide average daily trading volume after semi-annual announcements.

* Significant at 10%, two-tailed.
** Significant at 5%, two-tailed.
*** Significant at 1%, two-tailed.

system of equations. The second stage results are given in Panels A and B of Table 5. After we correct for simultaneity, we continue to find significant negative associations between the audit variable and return variability (or trading volume) in all three windows.

4.7. The change model

To check the sensitivity of our results against alternative model specifications, we test the following change model:

$$Change = \lambda_0 + \lambda_1 Size + \lambda_2 Audit + \lambda_4 Change_{annual} + \lambda_5 IMR + \lambda_6 ABS\_CAR + \lambda_7 y98 + \lambda_8 y99 + \lambda_9 00 + \varepsilon \quad (4)$$

where *Change* is $v_{post} - v_{pre}$ for the return variability test and $TV_{post} - TV_{pre}$ for the trading volume test. Similarly, $Change_{annual}$ is the change in return variability (or trading volume) over the annual report announcement period in the prior year. The results are reported in Table 6. The estimated coefficient of the audit variable is significantly negative across all three windows for both variability and trading volume models. In addition, we tested a size-deflated variability model by dividing both the left-hand side variable (V_{-pre}) and the right-hand side variable (V_{-post}) by *Size* and kept all other control variables unchanged. After running this model in all three event windows, we found that the results were not qualitatively different from that reported in Panel A

Table 6
Analysis of the effect of audit on the change between post- and pre-announcement stock-return variability and trading volume.

Event window	7 Days		15 Days		30 Days	
Panel A: Return variability model ($V_{post} - V_{pre}$)						
Intercept	0.719	(2.79)***	0.327	(1.66)*	0.233	(1.44)
Audit	−0.394	(−2.42)**	−0.450	(−3.54)***	−0.410	(−3.99)***
Size	−0.120	(−3.55)***	−0.079	(−3.09)***	−0.082	(−3.88)***
Ch_V$_{annual}$	−0.016	(−0.84)	−0.017	(−0.93)	−0.047	(−2.71)***
IMR	0.131	(1.28)	0.192	(2.43)**	0.190	(2.94)***
ABS_CAR	0.059	(8.41)***	0.032	(8.84)***	0.013	(6.54)***
Y98	0.084	(1.02)	0.239	(3.97)***	0.477	(10.53)***
Y99	−0.109	(−1.34)	−0.214	(−3.45)***	−0.461	(−9.51)***
Y00	0.203	(2.60)***	0.219	(3.64)***	0.255	(5.33)***
Adjusted R^2	0.059		0.093		0.244	
$n = 1710$ (616) for non-audited (audited) group						
Panel B: Trading Volume Model ($TV_{post} - TV_{pre}$)						
Intercept	−2.082	(−5.08)***	−0.432	(−0.96)	−0.202	(−0.56)
Audit	−0.818	(−4.33)***	−0.756	(−4.24)***	−0.644	(−3.56)***
Size	0.077	(2.03)**	0.048	(1.33)	0.043	(1.24)
Ch_TV$_{annual}$	−0.005	(−0.45)	−0.007	(−0.52)	−0.002	(−0.16)
IMR	0.448	(3.70)***	0.409	(3.61)***	0.322	(2.77)***
Ch_$_{MKT}$	0.929	(6.42)***	0.095	(0.48)	−0.294	(−1.95)*
ABS_CAR	0.190	(18.40)***	0.119	(20.11)***	0.068	(19.21)***
Y98	0.575	(3.76)***	0.099	(0.58)	0.479	(5.33)***
Y99	−0.150	(−1.27)	−0.692	(−5.53)***	−1.161	(−12.36)***
Y00	−0.258	(−2.93)***	−0.123	(−1.61)	0.065	(0.89)
Adjusted R^2	0.294		0.302		0.343	
$n = 1706$ (615) for non-audited (audited) group						

White-covariance-consistent t is reported in parentheses next to the estimated coefficient. Dependent variable in Panel A is $V_{post} - V_{pre}$ as defined in Table 4 over semi-annual announcement period; *Audit*: 1 for audited observations and 0 otherwise; *Ch_V$_{annual}$*: $V_{post} - V_{pre}$ over the annual financial statement announcement period; *Size*: Natural logarithm of beginning market value of equity; *IMR*: Inverse Mills Ratio; *ABS_CAR*: absolute value of risk-adjusted cumulative abnormal return over the post-announcement period. Dependent variable in Panel B is $TV_{post} - TV_{pre}$ over semi-annual announcement period; *Ch_TV$_{annual}$*: TV_{post} - TV_{pre} over annual announcement period; *Ch_$_{MKT}$*: Market-wide average daily trading volume after semi-annual announcements minus market-wide average daily trading volume before the announcements.

* Significant at 10%, two-tailed.
** Significant at 5%, two-tailed.
*** Significant at 1%, two-tailed.

of Table 4. Similarly, we constructed a size-deflated trading volume model and did not find results that were qualitatively different from that reported in Panel B of Table 4. Therefore, we conclude there is no evidence that our main results were driven by size.

4.8. Robustness checks[13]

4.8.1. Effect of auditing on frequency of modified audit opinions

Financial statements that are more reliable should be associated with a lower frequency of modified audit opinions (MAOs) *ceteris paribus*. We adopt the logistic regression model constructed by Chen et al. (2001) to test whether firms with audited semi-annual reports are less likely to receive MAOs at the year end as compared to those whose semi-annual reports are not audited. This model controls for the client's firm size, accounting performance (ROA), debt level, systematic risk (Beta) and other factors that affect the likelihood of receiving MAOs in China. The results show that the audited group has a significantly ($p < 0.01$) lower frequency of receiving MAOs than the non-audited group. This evidence is consistent with the notion that auditing improves the reliability of financial statements and thereby decreases the likelihood of MAOs.

[13] In the interest of space, empirical results reported in this section are not tabulated. However, they are available from authors upon request.

4.8.2. Analysis of firms that discontinue semi-annual audits

We compared a sample of 435 observations whose interim reports are audited in the current year with 377 observations whose interim reports were audited previously but not in the current year by estimating Model (2) and find that the *Audit* variable is significantly negative in all three event windows. This indicates that firms whose interim reports are audited in the current year show a lower return variability than firms who chose auditing of interim reports in the past but have since discontinued it. This finding is consistent with the argument that the reduced variability in returns arises from auditing of interim statements that year rather than firm characteristics or the auditing of the interim statements in previous years.

4.8.3. Analysis of first-time semi-annual audits

In this test, we focused on observations without repeated semi-annual audits to test whether our results were driven by repeatedly audited observations. The results remained qualitatively unchanged after we excluded repeatedly audited observations from our sample.

4.8.4. Effect of auditing when alternative empirical proxies are used

We performed additional tests to examine the robustness of the results when alternative empirical proxies are employed by repeating all regression analyses reported in Table 4. In the variability model, we replaced risk-adjusted returns with market-index-adjusted returns to calculate the standard deviation. In the trading volume model, we replaced average trading volume with total trading volume over the event window. Results were not qualitatively different. Furthermore, in addition to return variability and trading volume, we used the average difference between the daily high and low prices of the stock (the bid-ask spread information is not available to us) as a rough proxy for information asymmetry and found a significantly larger reduction in this variable for the audit group than for the non-audited group in all three event windows.

4.8.5. Examination of stock-return variability and volume using a matched sample

We also perform matched sample tests to check the robustness of our results as inherent firm-specific differences between audited and non-audited firms may affect both pre and post-announcement trading behavior. Audited observations are matched with non-audited ones by year on the following firm-specific variables individually: *SIZE*, *beta*, V_{pre} and TV_{pre}. This approach is essentially similar to including these firm characteristics as control variables in the model. However, matched samples are more homogeneous and the subsequent comparison of the effect of auditing is conducted between two groups of observations with similar size, systematic risk or pre-announcement belief divergence level, respectively. The results are not qualitatively different from those reported in Table 4.

4.8.6. Extended time period analysis

We explore the persistent length of time in the difference between audited and non-audited groups. We find no substantial differences between the standard deviations of audited and non-audited observations before −30 and after +30. Even though some minor differences continue for up to 180 days after the release of semi-annual financial statements, the system seems to typically reset itself after 30 days, with the inflow of more information.

4.8.7. Analysis after removing the period of variability and volume increase

As discussed earlier, the pattern of variability and volume changes shows an increase in the variability of stock returns[14] and volume of trading for two days following the announcement. We repeated our analysis removing the $[-2,+2]$ time period from the sample periods but this did not change our results.

[14] The absence of a well-developed options market in China precludes us from measuring implied variability based on option prices. Further, since variances calculated over a short window of two days may not be very reliable, we subtracted the variance calculated over the truncated post-announcement windows from that over the full post-announcement windows and compared the differences between these variance with the variances in the corresponding pre-announcement windows and found them to be positive for both audited and non-audited firms (showing an increase in variance over a two-day post-announcement period).

5. Concluding remarks

Using a sample of Chinese firms, we provide evidence that auditing decreases information divergence across investors measured by reduced stock return variability and trading volume. We find that the reduction in stock return variability and trading volume are both statistically significant and economically material. Results are robust after controlling for self-selection bias and several other factors. Our findings are consistent with the argument that investors place more weight on audited financial statements than on non-audited ones in pricing stocks.

Our results show that auditing has the beneficial effect of decreasing inter-investor divergence even in an emerging economy such as China. Our findings are consistent with the argument that the benefits of auditing in improving the confidence of ordinary investors who rely on public information do not require a highly developed market and legal infrastructure. From a policy perspective, emerging economies are justified in investing in auditing infrastructure and seeking to improve financial reporting quality to stimulate investments without necessarily waiting for the full development of legal and market infrastructures. China has justifiably taken steps to increase investor confidence by changes in regulations that create a disciplined and regulated audit market (China Securities Regulation Commission, 2000). The actions taken by Chinese regulators include: revocation of audit licenses for those involved in fraudulent financial reporting; closure of auditing firms that provide misleading audit reports; implementation of new audit standards modeled after international practices; and effecting more stringent disclosure requirements on firms receiving modified audit opinions.[15]

Although this study is based on the Chinese context, we believe that investors in China are motivated by similar economic incentives as in other parts of the world and to that extent the findings can be generalized to other emerging economies. However, institutional differences between countries should be considered when generalizing our results.

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Appendix A

In this appendix, we present a formal development of our reasoning. We show that when auditing reduces the bias and/or improves the precision of accounting information, there is less variability in stock returns and less trading volume in audited firms as compared to non-audited firms.

Step 1: Auditing increases the weight placed by investors on accounting information relative to non-accounting information in valuing stocks.

In this step, we consider only one investor and one stock. Ohlson (1995) and Easton (1999), posit a valuation model that combines accounting and non-accounting information. We write the market price of the stock as P, a linear combination of an accounting-based value as z, and a non-accounting based value as u:

$$P = \alpha_1 z + \alpha_2 u \tag{A1}$$

In Eq. (A1) the time t is suppressed. Under the Clean surplus model in Ohlson (1995), $z_t = [y_t - \delta(R-1)y_{t-1}] + \delta x_t$, where the subscript t represents a particular period, y is the book value, x is the earnings, R is the risk-free return and δ is a scalar. In a more general case, we can think of z as the valuation that results from all

[15] For example, since 1998, the names of firms that receive disclaimers and adverse opinions are required to be exposed on the front page of major securities newspapers once every two weeks.

accounting information inclusive of (but not limited to) book values and earnings of current and previous periods. On the other hand, u represents the valuation that results from all non-accounting information available in the market during the relevant period.

For any particular individual investor, however, the valuation of the stock depends on how he or she aggregates the two sources of information. In particular, all non-accounting information is not available to all investors. Non-accounting information includes private information that is distributed among investors. Some investors receive more information than others.[16] Given these differences, the stock valuation by investor i can be written as follows:

$$V_i = \gamma_1 z^R + \gamma_2 u_i \tag{A2}$$

In Eq. (A2), z^R represents valuation that results from the set of reported financial statement information. Since financial statement information is public and common to all investors, there is no subscript i in the valuation of that information.[17] Yet, z^R may still differ from the true z (which is unobservable). We capture the dispersion of the accounting information by the variance of z^R. In contrast, non-accounting information u_i denotes investor i's valuation of non-accounting information that he can access.[18] The valuation component u_i could vary across different investors depending on the access, interpretation ability and the effort of the investors.[19] We denote dispersion in the valuation component based on non-accounting information by its variance σ^2. We assume that the stock value expected across investors, $E(V_i)$ is the expected stock market price.

We focus on the relative weights, γ_1 and γ_2, that investors place on accounting and non-accounting valuation, respectively. In this analysis, we assume that auditing could have two specific effects on accounting information and, therefore, on valuation: (i) to screen firms whose financial reports are biased and/or unreliable by issuing qualified reports and (ii), to discipline the report production process and increase the precision and unbiasedness of reported financial statement numbers.[20]

We assume (without loss of generality) that when financial statements are not qualified, investors do not expect statements to be biased and attribute a high reliability to numbers reflected by a low variance of z^R which we denote by ψ_1^2. However, when financial statements are qualified, this signals to investors the possibilities of bias and lower reliability in the reported accounting valuation z^R, relative to unqualified reports. We denote the perceived bias by the variable 'a' and the reduced perceived reliability[21] of financial statements by an increased variance $\psi_2^2 > \psi_1^2$. These notations are captured in the following expressions of probability density functions[22]:

$$\begin{aligned} &f(z^R|z,\ \textit{clean opinion}) \sim f(z, \psi_1^2);\ \text{and,} \\ &f(z^R|z,\ \textit{qualified opinion}) \sim f(z+a,\ \psi_2^2) \end{aligned} \tag{A3}$$

Further, if the firm is not audited, the lack of audit information adds an additional variance ψ_3^2. We also denote the prior probability of an unqualified report by p.

[16] There is considerable recent literature that recognizes this difference between informed and relatively uninformed investors (Easley and O'Hara, 2004; Brockman and Chung, 2003; Goel and Thakor, 2003; Brennan and Subrahmanyam, 1996).

[17] It is possible for investors to use different valuation functions to value common information and arrive at different valuations. Alternatively, the differences in valuation function can also be viewed as differences in other information.

[18] Even though much of the non-accounting information might be available publicly, its interpretation by different investors can be different. There is no common process like GAAP that guides the production and communication of non-accounting information. We seek to capture this aspect of non-accounting information in the model by the term u_i.

[19] We assume the information risk to be common to all the investors, but different for different sources of information. In other words, we assume that all investors harbor the same degree of skepticism about accounting information; and that they share similar skepticism about non-accounting information, which could differ from their skepticism about accounting information.

[20] We show later that either one of these audit effects is sufficient to reduce the variance of the stock price (and returns) in the market.

[21] This is the signaling effect of auditing. While the bias and reliability of the numbers are not known, investors will assume that the bias and lack of reliability are at threshold levels that can be detected by an auditor after prescribed auditing practices. These threshold levels are 'a' for the bias and the increased variance ψ_2^2.

[22] Only the mean and the variance of the density function are shown in expressions (A3). This is not meant to imply that the density function is fully defined by the first two moments.

With the above notation, the variance of the accounting component of the valuation in a non-audited firm is given by

$$\xi^2 = p\psi_1^2 + (1-p)\psi_2^2 + p(1-p)a^2 + \psi_3^2 \tag{A4}$$

The investor optimally weighs the accounting and non-accounting sources of valuation information by a minimum variance aggregation process (see Banker and Datar, 1989, for a theoretical basis for the aggregation process) by solving the following optimization problem[23]:

$$\underset{\gamma_{1ui},\gamma_{2ui}}{Minimize} \quad \gamma_{1u}^2\xi^2 + \gamma_{2u}^2\sigma^2 \quad subject\ to\ \gamma_{1u} + \gamma_{2u} = 1 \tag{A5}$$

In the above expression, γ_{1u} is the weight placed on accounting information and γ_{2u} is the weight placed on non-accounting information. The subscript 'u' denotes 'non-audited' financial statements.

This yields optimal weights

$$\gamma_{1u} = \frac{\sigma^2}{\sigma^2+\xi^2} \quad \text{and} \quad \gamma_{2u} = \frac{\xi^2}{\sigma^2+\xi^2} \tag{A6}$$

With the audit, the firm might get a clean opinion with probability p or a qualified opinion with a probability $(1-p)$. The expected optimal weights will be as follows:

$$\gamma_{1a} = \left[\frac{p\sigma^2}{\sigma^2+\psi_1^2} + \frac{(1-p)\sigma^2}{\sigma^2+\psi_2^2}\right] \quad \text{and} \quad \gamma_{2a} = \left[\frac{p\psi_1^2}{\sigma^2+\psi_1^2} + \frac{(1-p)\psi_2^2}{\sigma^2+\psi_2^2}\right] \tag{A7}$$

In (A7), subscript 1 stands for weight on accounting information and subscript 2 for weight on non-accounting information. Subscript 'a' denotes audited financial statements.

An examination of (A6) and (A7) reveals that $\gamma_{1a} > \gamma_{1u}$ and $\gamma_{2a} < \gamma_{2u}$. In effect, audited financial statement numbers are weighted more than non-audited ones relative to the weighting of non-accounting information.

Step 2: Auditing reduces the variance in stock valuations by investors.

Heretofore, we have focused on one investor. We will now examine the divergence among investors. The valuation of the stock by the ith investor is given by (A2):

$$V_i = \gamma_1 z^R + \gamma_2 u_i$$

The first term is common to all investors. The second term consists of non-accounting information, which could be different for different investors. When we take the variance of V_i across investors, we have

$$Variance\ (V_i) = \gamma_2^2 Variance\ (u_i) \tag{A8}$$

From step 1, we know that $\gamma_{2a} < \gamma_{2u}$. Therefore, from (A8) we see that the expected variance of the stock values perceived by investors is less for audited firms than for non-audited firms, *ceteris paribus.*

Further, for a given market price of the previous period, (P_{t-1}), the expected return on the stock is given by $(V_i - P_{t-1})/P_{t-1}$. The expected return will be equal to the market return. The expected variance of the market return will be equal to $[Variance\ (V_i)]/P_{t-1}^2$. Therefore, we expect audited firms to have a lower variance of market returns relative to non-audited firms. The differences in valuation by different investors also lead to a greater trading volume. Therefore, after we control for other determinants of trade volume, we expect the trade volume for audited firms to be less than the expected trade volume for non-audited firms.

[23] This problem is solved under the assumption that the two information sources do not covary with each other. Adding covariance does not change results, but complicates the expressions. Therefore, we present the no covariance version.

References

Alford, M.R., Edmonds, T.P., 1981. A replication: does auditor involvement affect the quality of semi-annual report numbers? J. Account., Audit. Finan. 4, 255–264.

Ashton, R., Kennedy, J., 2002. Eliminating recency with self-review: the case of auditors' 'going concern' judgments. J. Behav. Dec. Mak. 15 (3), 221–231.

Atiase, R.K., Bamber, L.S., 1994. Trading volume reactions to annual accounting earnings announcements. J. Account. Econ. 17 (3), 309–329.

Banker, R.D., Datar, S.M., 1989. Sensitivity, precision, and linear aggregation of signals for performance evaluation. J. Account. Res. 27 (1), 21–39.

Beaver, W.H., 1968. The information content of annual earnings announcements. J. Account. Res. 6 (Supplement), 67–92.

Becker, C.L., DeFond, M., Subramanyam, K.R., 1998. The effect of audit quality on earnings management. Contemp. Account. Res. 15 (1), 1–24.

Brennan, M., Subrahmanyam, A., 1996. Market microstructure and asset pricing: on the compensation for illiquidity in stock returns. J. Finan. Econ. 41 (3), 441–464.

Brockman, P., Chung, D.Y., 2003. The inter-temporal behavior of informed and uninformed traders. Rev. Quant. Finan. Acc. 21 (3), 251–265.

Brown, L.D., Pinello, A.S., 2007. To what extent does the financial reporting process curb earnings surprise games? J. Account. Res. (December).

Callen, J., 2008. Shocks to shocks: a theoretical foundation for the information content of earnings. Contemp. Account. Res. (forthcoming).

Chen, J.P., Su, X., Zhao, R., 2000. An emerging market's reaction to initial qualified audit opinions: evidence from the Shanghai stock exchange. Contemp. Account. Res. 17 (3).

Chen, J.P., Chen, S., Su, X., 2001. Profitability regulation, earnings management and modified audit opinions: evidence from China. Audit.: J. Pract. Theory 20 (2), 9–30.

China Securities Regulatory Commission Shenzhen Office, CSRC Shenzhen, 2000. The Latest Collection of Securities Laws & Regulations. Guangdong Economics Publications, Guangzhou.

Choi, S.K., Jeter, D.C., 1992. The effect of qualified audit opinion on earnings response coefficients. J. Account. Econ. 14, 229–247.

Choi, J., Kim, J.-B.V., Liu, X., Simunic, D.A., 2008. Audit pricing, legal liability regimes, and big 4 premiums: theory and international evidence. Contemp. Account. Res. (forthcoming).

Chow, C.W., 1982. The demand for external auditing: size, debt and ownership influences. Account. Rev. 57, 272–291.

Craig, V., 2005. China's Opening to the World: What Does it Mean for US Banks? Federal Deposit Insurance Corporation, http://www.fdic.gov/bank/analytical/banking/2005nov/article1.html.

Dechow, P.M., Dichev, I.D., 2002. The quality of accruals and earnings: the role of accrual estimation errors. Account. Rev. 77 (Supplement), 35–59.

DeFond, M.L., Wong, T.J., Li, S.H., 2000. The impact of improved auditor independence on audit market concentration in China. J. Account. Econ. 28, 269–305.

DeFond, M.L., Raghunandan, K., Subramanyam, K.R., 2002. Do non-audit service fees impair auditor independence? Evidence from going concern audit opinions. J. Account. Res. 40 (4), 1247–1274.

Durnev, A., Morck, R., Yeung, B., Zarowin, P., 2003. Does greater firm-specific return variation mean more or less informed stock pricing? J. Account. Res. 41 (5), 797–836.

Dyck, A., Zingales, L., 2004. Private benefits of control: an international comparison. J. Finan. 59 (2), 537.

Easley, D., O'Hara, M., 2004. Information and the cost of capital. J. Finan. 59 (4), 1553–1583.

Easton, P.D., 1999. Security returns and the value relevance of accounting data. Account. Horiz. 13 (4), 399–412.

Ederington, L.H., Lee, J.H., 1996. The creation and resolution of market uncertainty: the impact of information releases on implied volatility. J. Finan. Quant. Anal. 31 (4), 513.

Ettredge, M.L., Simon, D.T., Smith, D.B., Stone, M.S., 2000. The effect of the external accountant's review on the timing of adjustments to quarterly earnings. J. Account. Res. 38 (1), 195–207.

Ferreira, M.A., Laux, P.A., 2007. Corporate governance, idiosyncratic risk, and information flow. J. Finan. 62 (2), 951–988.

Francis, J.R., Maydew, E.L., Sparks, H.C., 1999. The role of big 6 auditors in the credible reporting of accruals. Audit.: J. Pract. Theory 18, 17–34.

Gillette, A.B., Stevens, D.E., Watts, S.G., Williams, A.W., 1999. Price and volume reactions to public information releases: an experimental approach incorporating traders' subjective beliefs. Contemp. Account. Res. 16 (3), 437.

Givoly, D., Ronen, J., Schiff, A., 1978. Does auditor involvement affect the quality of semi-annual report numbers? J. Account., Audit. Finan. 1, 361–372.

Goel, A.M., Thakor, A.V., 2003. Why do firms smooth earnings? J. Bus. 76 (1), 151–192.

Haw, I.-M., Qi, D., Wu, W., 2008. The economic consequence of voluntary auditing. J. Account., Audit. Finan., 63–93.

Haw, I.G., Park, K., Qi, D., Wu, W., 2003. Audit qualification and timing of earnings announcements: evidence from China. Audit.: J. Pract. Theory 22 (2), 121–146.

Haw, I.-M., Hu, B., Hwang, L.-S., Wu, W., 2004. Ultimate ownership, income management, and legal and extra-legal institutions. J. Account. Res. 42 (2), 423.

Heckman, J., 1976. The common structure of statistical models of truncation, sample selection, and limited dependent variables and a simple estimator for such models. Ann. Econ. Soc. Measur. 5, 475–492.
Johnston, J., DiNardo, J., 1997. Econometric Methods. McGraw Hill Companies, New York.
Keshk, O.M.G., 2003. CDSIMEQ: a program to implement two-stage probit least squares. Stata J. 3, 1–11.
Kim, O., Verrecchia, R.E., 1991. Trading volume and price reactions to public announcements. J. Account. Res. 29 (2), 302–321.
Kim, O., Verrecchia, R.E., 1997. Pre-announcement and event period private information. J. Account. Econ. 24 (3), 395–419.
LaPorta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1998. Law and finance. J. Polit. Econ. 106 (6), 1113.
Larcker, D., Rusticus, T.O., 2005. On the Use of Instrumental Variables in Accounting Research, working paper. University of Pennsylvania.
Leahy, C., 2004. China faces a stock market breakdown. Euromoney London, December 2004, p. 1.
Lobo, G.J., Tung, S., 1997. Relation between predisclosure information asymmetry and trading volume reaction around quarterly earnings announcements. J. Bus. Finan. Account. 24 (6), 851–867.
Loudder, M.L., Khurana, I.K., Sawyers, R.B., Cordery, C., Johnson, C., Lowe, J., Wunderle, R., 1992. The information content of audit qualifications. Audit.: J. Pract. Theory 11 (1), 69–82.
May, R., 1971. The influence of quarterly earnings announcements on investor decisions as reflected in common stock price changes. Emp. Stud. Account.: Select. Stud. J. Account. Res. Suppl. 9, 119–171.
Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements? J. Financ. Econ. 58 (1, 2), 215–260.
Ohlson, J.A., 1995. Earnings, book values, and dividends in equity valuation. Contemp. Account. Res. 11 (2), 661–687.
Patell, J.M., Wolfson, M.A., 1981. The ex ante and ex post price effects of quarterly earnings announcements reflected in option and stock prices. J. Account. Res. 19 (2), 434.
Rajgopal, S., Venkatachalam, M., Kotha, S., Erickson, M., 2002. Managerial actions, stock returns, and earnings: the case of business-to-business internet firms/discussion. J. Account. Res. 40 (2), 529.
Roll, R., 1988. Presidential address: R2. J. Finan. 43 (3), 541–566.
Srinidhi, B., Hossain, M., Lim, C.Y., 2008. Cross-Country Analysis of Auditor Specialization Premium: Effect of Legal, Extra-legal and Political Environments, Working Paper. The Hong Kong Polytechnic University.
Teoh, S.H., Wong, T.J., 1993. Perceived auditor quality and the earnings response coefficient. Account. Rev. 68 (2), 346–366.
Yeung, E., 2009. Uncertainty and expectation revisions after earnings announcements. Contemp. Account. Res. 26 (1/Spring 2009), 273–301.